Psychology of Aesthetics, Creativity, and the Arts
2015, Vol. 9, No. 2, 178–186

1931-3896/15/$12.00 http://dx.doi.org/10.1037/aca0000017

Defining 21st Century Readiness for All Students: What We Know and How to Get There

Helen Soulé and Tatyana Warrick
Partnership for 21st Century Learning, Washington, DC

Spanning a decade of leading the 21st century learning movement, this article provides an overview of the common foundation for citizenship, college and career readiness, as well as the needed support systems for learning embedded in the Framework for 21st Century Learning. The authors provide a summary of the research, which underscores the need for an updated approach for education, with a focus on the key set of skills known as the 4Cs—creativity, communication, collaboration, and critical thinking—unpacking the various gaps in skills and achievement that are plaguing our society. Finally, the article offers a rationale and practical application as well as key recommendations for best practices to ensure educational excellence and preparation to all students.

Keywords: 21st century learning, workforce readiness, creativity, skills gaps

As we enter the second decade of the 21st century, our schools and our education system are facing unprecedented challenges because of chronic underperformance and a domestic and international skills gaps alongside fundamental changes in the global economy and in the nature of work itself. To meet the growing global demand for workers and citizens who not only succeed, but who can lead in this hyperconnected, diverse, and complex world, the Partnership for 21st Century Learning (P21), a leading nonprofit organization, has been working in collaboration with educators, business leaders, and policy-makers for more than a decade to establish what college and career readiness means for this new world of work, learning, and citizenship.

P21 is a coalition of education, business, community, and government leaders working to help build a broader awareness of the importance of a 21st century education system. The goal of P21 is to support the innovative, collaborative, and community-embedded experiences that can provide all students the opportunity to become effective citizens, workers, and leaders; to learn what they need to join 21st century communities and workplaces; and to thrive in learning environments aligned with the real world. Given that our school systems were designed to meet the needs of an industrial economy operating on an agrarian calendar, they must be redesigned to support the global, information-centric, and technology-infused reality of the 21st century.

Survival Skills for the 21st Century Knowledge Economy

The world we live in today has changed dramatically in the last several decades, presaging even more dramatic changes for what our world will look like when today's students enter the workforce. Rapid technological advances and an increasingly global economy have fundamentally altered our social and economic lives. From reinvigorating a stalled economy, to achieving energy independence with alternative technologies and green jobs, to strengthening our health-care system and preserving our environment, the challenges our children will face require an educated populace with the knowledge, skills, imagination, fortitude, and educational excellence for all as never before. Given these substantial demands, we now need to educate all of our students better and differently than ever before.

Although skills such as self-direction, creativity, critical thinking, and innovation may not be new to the 21st century, they are newly relevant in an age in which the ability to excel at nonroutine work is not only rewarded, but is expected as a basic requirement for success. Whether a high school graduate plans to directly enter the workforce or attend a vocational school, community college, or university, he or she must be able to think critically and creatively solve problems, communicate effectively, collaborate, find and assess information quickly, and effectively use technology. These are today's survival skills—not only for career success but also for a quality personal and civic life (P21, 2010).

A Lack of 21st Century Readiness

There is widespread consensus that our education system is failing to adequately prepare all students with the essential 21st

Helen Soulé and Tatyana Warrick, Partnership for 21st Century Learning, Washington, DC.

The authors are employees of P21, the Partnership for 21st Century Learning, which owns the copyright to the Framework for 21st Century Learning (Figure 1) discussed in this article. However, the authors do not have a financial interest resulting from the publication. P21 does not stand to gain financial benefit from publication of this article or the research presented. P21 retains copyright of the material.

Correspondence concerning this article should be addressed to Tatyana Warrick, 1 Massachusetts Avenue NW, Suite 700, Washington, DC 20001. E-mail: tatyana@p21.org

century knowledge and skills necessary to succeed in school, career, life, and citizenship (P21, 2010). Low performance across core content areas persists according to data for fourth and eighth graders for the 2011 National Assessment of Educational Progress (NAEP; Institute of Education Sciences, 2011). Although most students score in the "basic" range on this assessment, it is important to note that NAEP defines basic as "partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade assessed" whereas "proficient" is defined as

> Representing solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter (Institute of Education Sciences, 2011).

Unfortunately, only 34% of fourth and eighth graders score proficient in reading whereas 40% of fourth graders and 35% of eighth graders score proficient in mathematics. Likewise, only 32% of eighth graders are rated as proficient in science (Institute of Education Sciences, 2011). These data are largely unchanged for most of the past 10 years, and these results are troubling, especially because those with only basic competencies are the most likely to flounder in today's increasingly high-skill, high-wage service economy.

Domestic Achievement Gap

Beyond the challenges of meeting basic measures of student proficiency is the opportunity gap in achievement between the lowest- and highest-performing students, between the poorest and most affluent, and between minority and majority students. Although the recent trend data show some improvements at the fourth-grade level, which is promising, these gaps exacerbate our need for all students to be highly educated. For example, in fourth-grade reading, 33% of White students were proficient compared with 14% of Black students and 16% of Hispanics. In eighth-grade reading, 38% of White students were proficient compared with 14% of Black students and 18% of Hispanics. In fourth-grade mathematics, 48% of White students were proficient compared with 16% of Black students and 22% of Hispanics. In eighth-grade mathematics, 33% of White students were proficient compared with 12% of Black students and 18% of Hispanics. In eighth-grade science, only 43% of White students were proficient compared with 10% of Black students and 16% of Hispanic students (Institute of Education Sciences, 2011). In writing, a skill in particular demand for almost all employers, only 41% of White students, 16% of Black students, 18% of Hispanics, and 15% of low-income students reached proficiency in the 2007 NAEP (Salahu-Din, Persky, & Miller, 2008).

In addition, radical demographic changes highlight the urgency of closing these persistent gaps. The U.S. Census Bureau (2008) projects that the U.S. population will be older and more diverse by the middle of this century, with racial and ethnic minorities comprising the majority of the nation's population by 2042, and children expected to be 62% minority by 2050, up from 44% today. This accelerating diversification will challenge efforts to improve student performance and narrow achievement gaps. Closing these achievement gaps is an essential civil rights challenge as well as an economic one (P21, 2008).

Global Achievement Gap

The challenge also extends beyond our borders to the rest of the world. Countries as diverse as Australia, Brazil, China, Finland, Korea, India, Montenegro, and Singapore have all recognized the vital importance of education as the engine for economic growth and have invested heavily in primary, secondary, and postsecondary education at a time when U.S. academic achievement has plateaued and many of our own students are not achieving proficiency on domestic measures.

On the most recent administration of the Programme for International Student Assessment (PISA) and other international assessments, U.S. students continue to fare poorly compared with their counterparts (Organisation for Economic Co-Operation & Development, 2011). These results are not simply educationally significant; they also have important economic significance.

Countries that perform well on PISA, which measures 21st century skills such as critical thinking and problem-solving, have demonstrated higher increases in gross domestic product (GDP) growth than countries that do not, according to a series of studies by Stanford University researchers (P21, 2008). In addition, an unintended consequence of U.S. efforts in closing the national achievement gaps has been a lack of attention to the global achievement gap and to the growing competitive demand for advanced skills around the world (P21, 2010). Recent scholarship indicates that many of these countries are no longer content to succeed in traditional measures but are also embarking on efforts to embed 21st century skills into their education systems (Saavedra & Opfer, 2012).

How the Nature of Work Has Changed

At the same time the United States faces increasing worldwide investment in education and U.S. companies are competing in an ever-increasing global marketplace, the nature of our own economy is also transitioning. Over the last several decades, the industrial economy based on manufacturing has shifted to a service economy driven by information, knowledge, innovation, and creativity, and this has reshaped workplaces and the nature of work.

Jobs have shifted from manufacturing to services, particularly in higher paid information services. Today, more than 80% of jobs are in the service sector, which includes high-growth, high-wage, and high-skilled occupations in new and emerging industries. The employment of professionals and related occupations is expected to increase by nearly 16.8%, growing by over 5.2 million jobs (U.S. Department of Labor & Bureau of Labor Statistics, 2009). These projections still appear to be on target in 2012, with the service sector seeing the most growth and employment in manufacturing and materials seeing a gradual and steady decline (U.S. Bureau of Labor Statistics, 2012). High-end positions such as doctors, lawyers, engineers, and marketing specialists represent the fastest employment opportunities in the service sector with steady growth. Demand is increasing throughout the world for "knowledge technologists" with a wide range of education, training, and skills. This skills gap is also occurring just as those in the baby boom generation—the most experienced workers with the greatest knowledge and skills—are poised to retire in large numbers.

New technologies have also had a significant effect on how businesses function. Information and communications technologies (ICT) often have supported changes in organizational structures and practices, including new methods of communications, flatter management structures, decentralized decision-making, information sharing and the use of task teams, cross-organizational networking, just-in-time inventory, and flexible work arrangements (P21, 2010; see also Gera & Gu, 2004; Pilat, 2004).

New Skill Demands

These fundamental changes in the economy, jobs, and businesses are driving new, different skill demands. Today more than ever, individuals must be able to perform nonroutine, creative tasks if they are to succeed. Autor, Levy, and Murnane (2003) found that, beginning in the 1970s, the labor input of routine cognitive and manual tasks in the U.S. economy declined and the labor input of nonroutine analytic and interactive tasks increased. And as firms take up technology, computers substitute for workers who perform routine tasks, but they complement workers who perform nonroutine problem-solving. Hence, computerization of the workplace has raised the demand for problem-solving and communications tasks, such as responding to discrepancies, improving production processes, and coordinating and managing the activities of others (P21, 2008).

The creativity, innovation, and adaptability that are the hallmarks of competitive, high-growth, and emerging industries require a highly skilled, creative, and nimble workforce (Ewing Marion Kauffman Foundation, 2007). Advanced economies compete by producing "innovative products and services at the global technology frontier using the most advanced methods" (Porter, Ketels, & Delgado, 2007). High-income countries have a high capacity for innovation, and the critical thinking and problem-solving skills measured on PISA, which Hanushek, Jamison, Jamison, and Woessmann (2008) term "cognitive skills," differentiated the economic leaders from the laggards among 50 countries from 1960 to 2000: "A highly skilled workforce can raise economic growth by about two thirds of a percentage point every year."

Cognitive skills are significantly more important in determining economic outcomes than a traditional measure of educational success—school attainment. According to Eric Hanushek et al. (2008),

> Increasing the average number of years of schooling attained by the labor force boosts the economy only when increased levels of school attainment also boost cognitive skills. In other words, it is not enough simply to spend more time in school; something has to be learned there.

U.S. employers have repeatedly validated the range of skills needed in today's economy. Together with the Conference Board, Corporate Voices for Working Families, and the Society for Human Resource Management, P21 conducted a survey of 431 employers representing a combined workforce of over 2 million U.S. employees. The survey represented multiple career sectors, including manufacturing, business and professional services, health care, entertainment, trade, and finance. The report on these findings, enumerated in *Are They Really Ready to Work?* P21 et al. (2006) provides a better understanding of the readiness of new entrants to the workforce.

This survey research indicated that well over one half of employers found that at the high school level, new workforce entrants were insufficiently prepared in some of the most important skills they demanded of employees, including oral and written communications, professionalism and work ethic, critical thinking and problem-solving, and creativity and innovation. Although more than 80% of respondents assessed the 4C skill areas of communication, collaboration, critical thinking and problem-solving, and creativity and innovation as "very important for job success," almost one quarter of respondents found that even 4-year college graduates were deemed deficient in these areas. Another survey conducted in conjunction with the American Management Association (2010) of 2,115 managers and other executives identified similar skills gaps, finding that the new workplace requires employees to be able to think critically, solve problems, innovate, collaborate, and communicate more effectively at every level within an organization.

Strengthening Skills for the 21st Century

There clearly is growing demand for a set of applied skills. In fact, many experts now place a greater weight on the importance of 21st century skills, going so far as to refer to them as "survival skills" in the new economy (Wagner, 2008). They recognize that higher-order thinking and deeper knowledge are no longer a luxury.

Technology changes would offer an apparent opportunity for young professionals to excel in comparison to peers in the workplace; surprisingly, this is not the case. There is "a significant technology paradox," according to Edward E. Gordon, author of *Winning the Global Talent Showdown*: "While overall younger workers are 'tech junkies,' they lack the talent qualifications or even interest in careers centered on designing, making, repairing or applying and managing many 21st-century technologies" (Gordon, 2009).

One might ask how a mismatch between the kind of skilled workers needed and the ranks of the unemployed can be addressed. Furthermore, can the "human capital performance gap" be addressed and strengthened? The answers and responsibilities do not rest solely with schools. Significant skill, talent, and capacity challenges offer schools an opportunity to redefine and retool delivery of learning in ways that may address the skills and other achievement gaps faced by our education system.

The Framework for 21st Century Learning

To help practitioners integrate 21st century skills in schools and make learning more relevant for students, P21 has developed a unified, collective vision to address these challenges, enumerated in the Framework for 21st Century Learning (see Figure 1) (P21, 2009c). The framework encompasses the skills, knowledge, and expertise that students must master to succeed in work and life as well as the support systems necessary to support 21st century learning. The framework highlights a blend of content knowledge, specific skills, expertise, and literacies, and it provides an expansive definition of college and career readiness. Used by thousands of educators across the country and globally, the Framework for

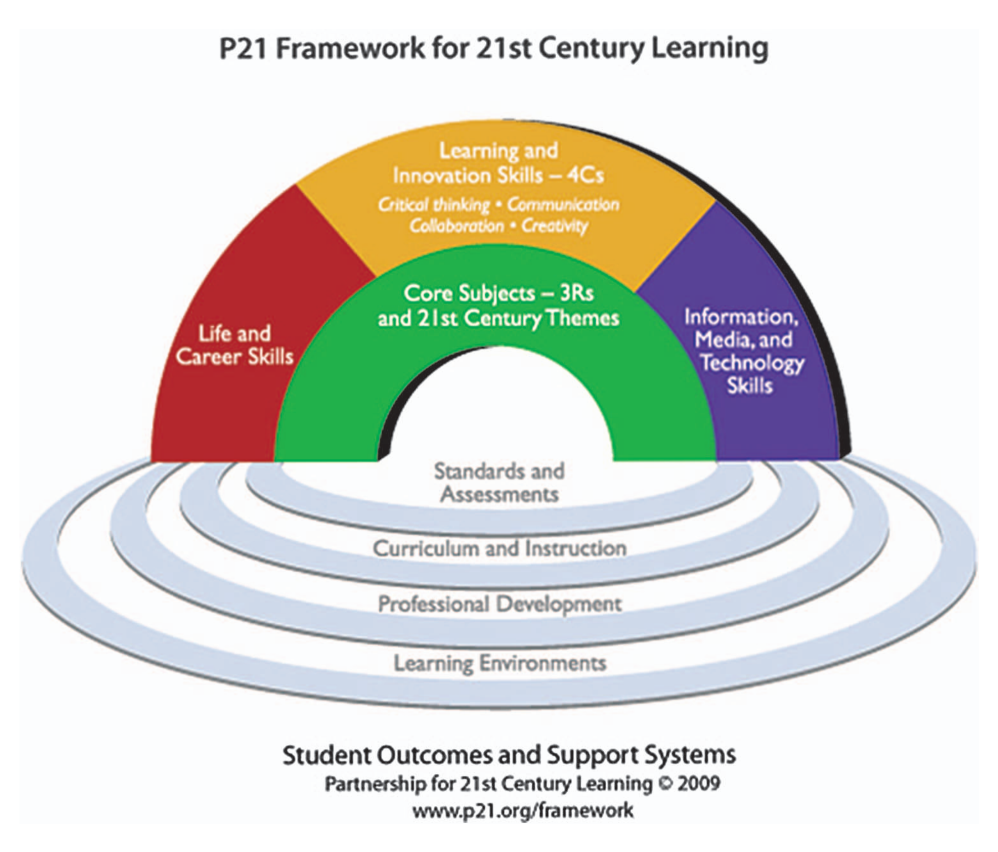


Figure 1. P21 Framework for 21st Century Learning (P21, 2009c). See the online article for the color version of this figure.

21st Century Learning represents a powerful solution for integrating learning for the demands of work, life, and citizenship.

Every implementation strategy for 21st century learning requires the development of core academic subject knowledge and understanding among all students. Core academic subject knowledge is essential. Within the context of core knowledge instruction, students must also master the essential skills for success in today's world, known collectively as the 4Cs: critical thinking and problem-solving, communication, collaboration, and creativity and innovation.

When a school or district builds on this foundation, combining the necessary support systems—standards, assessments, curriculum and instruction, and professional development and learning environments—students are more engaged in the learning process and graduate better prepared to thrive in college, career, and life. In addition, educators experience greater collaboration, interdisciplinary application of curriculum, and support.

The foundation of the framework is the set of learning and innovation skills often referred to as the shorthand 4Cs of creativity, critical thinking, communication, and collaboration, which are essential in preparing students for the future. Creativity plays an important role in the framework and involves using a wide range of idea creation techniques (such as brainstorming); creating new and worthwhile ideas (incremental and radical concepts); and elaborating, refining, analyzing, and evaluating one's own ideas to improve and maximize creative efforts. This skill includes working creatively with others through developing, implementing, and effectively communicating new ideas to others; being open and responsive to new and diverse perspectives; incorporating group input and feedback; demonstrating originality and inventiveness; and viewing failure as an opportunity to learn.

Because we live in a technology- and media-driven environment that is marked by access to an abundance of information with rapid changes in technology tools, the importance of students' ability to create, collaborate, communicate, and think critically about new technologies has increased on an unprecedented scale. Effective citizens and workers must be able to exhibit a range of functional and critical information, media, and technology skills.

21st Century Standards

Standards drive the critical elements of the U.S. educational system: the curricula that schools follow, the textbooks (digital or print) that students read, and the tests that they take. In addition, standards establish the levels of performance that students, teachers, and schools are expected to meet. Although standards typically define essential academic content knowledge, they should also define the skills that contribute to success in modern life, such as life skills; learning and innovation skills; and information, media, and technology skills. Over the past 2 decades, state agencies and educational groups have paid considerable attention to describing what content students need to know without adequately addressing the more complex thinking and technical skills that will govern 21st century life (P21, 2009e).

The release of the Common Core State Standards (CCSS) in 2010 has been an important turning point in the standards movement. For the first time, most states have agreed to a common baseline for academic knowledge and college readiness skills (P21, 2011). P21 has long advocated that the full range of knowledge and skills articulated in the P21 framework be integrated explicitly into standards, assessments, curriculum, instruction, professional development, and learning environments. From this perspective, the CCSS for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (ELA) and the CCSS for Mathematics are a welcome development in the standards movement for several key reasons. First, the CCSS explicitly call for, and integrate, higher-order thinking skills as a means to achieving career and college readiness for all students. Finally, the CCSS documents establish critical thinking, reasoning, communication, and media/information/technology literacy in ELA and mathematics as key performance outcomes around which curricula and assessments should be focused (P21, 2011).

The CCSS Mathematics standards provide an excellent step forward in the integration of critical thinking and reasoning in the teaching and learning of math. P21 supports the view that mathematics as a content area is inherently aligned with the 4Cs. Solving problems that have not been solved before, finding proofs, puzzling, understanding patterns, and finding meaning in statistics all require critical thinking, creativity, innovation, and information literacy. These habits of mind are evident in the CCSS and are central to the teaching and learning of mathematics, as has been advocated by national mathematics content groups such as the National Council of Teachers of Mathematics (NCTM; P21, 2011).

The Standards for Mathematical Practice draw from NCTM's process standards (problem-solving, reasoning and proof, communication, representation, and connections) and the strands identified by the National Research Council's report *Adding it Up* (adaptive reasoning, strategic competence, conceptual understanding, procedural fluency, and productive disposition). The practices section aligns with several key competencies in the P21 framework (P21, 2011).

On the whole, although P21 applauds the efforts of the CCSS, it also recognizes that these standards must be the "floor" and not the "ceiling" of what is expected for students (see Plucker, 2015). The CCSS align specifically with multiple elements of the P21 framework, but there are critical skills that are absent or underrepresented. Vital skills such as creativity and many of the life and career skills, although sometimes implied by the language of the CCSS, are in danger of being eliminated or overlooked without vigilance on the part of educators and school leaders. Consequently, P21 sees the ongoing conversation about CCSS implementation as an important entry point for a dialog about the inclusion of 21st century skills.

Assessing 21st Century Skills

Most K–12 assessments in widespread use today—whether 21st century skills and content or of traditional core subject areas—measure knowledge of discrete facts, not the ability to apply knowledge in complex situations. High-stakes assessments alone do not generate evidence of the skill sets that the business and education communities believe will ensure success in the world today. The 21st century accountability systems—including all forms of measurement—must assess the key dimensions of 21st century learning; they must measure those skills now prized in a complex global environment (P21, 2009a).

These assessment regimes should support a balance of assessments, from high-quality standardized testing to portfolios, rubrics, and effective formative and summative classroom assessments. Assessments should emphasize useful feedback on student performance that is embedded into everyday learning and utilize a balance of technology-enhanced assessments that measure student mastery of 21st century skills. Portfolios of student work that demonstrate mastery of 21st century skills to educators and prospective employers are valuable in building a balanced combination of measures to assess the educational system's effectiveness in reaching high levels of student competency in 21st century skills (P21, 2009c).

21st Century Curriculum and Instruction

21st Century Curriculum and Instruction teaches and embeds 21st century skills in the context of core subjects and 21st century interdisciplinary themes, focusing on providing opportunities for applying 21st century skills across content areas and for a competency-based approach to learning. Such an approach to pedagogy and instruction enables innovative learning methods that integrate the use of supportive technologies, inquiry- and problem-based approaches, and higher-order thinking skills and it encourages the integration of community resources beyond school walls (P21, 2009c).

21st Century Professional Development

21st Century Professional Development supports teachers and administrators as they incorporate 21st century skills into their schools and classrooms. All professional development efforts should exist as part of an aligned system of teaching and learning that includes 21st century learning standards, curriculum, instruction, and assessments (P21, 2009d). Successful professional development initiatives around 21st century skills, such as most effective professional development efforts, include fundamental characteristics that are widely accepted, including highlighting ways teachers can seize opportunities for integrating 21st century skills, tools, and teaching strategies into their classroom practice and helping them identify what activities they can replace/de-emphasize.

21st Century Learning Environments

The term "learning environment" includes not only place and space (e.g., a school, a classroom, a library, an online learning community), but it also encompasses the relationships that create a supportive environment for every child's development. In the 21st century, learning environments should be seen as the support systems that organize the conditions in which humans learn best—systems that accommodate the unique needs of every learner and support the positive human relationships needed for effective learning (P21, 2009b).

A child who enters school in good health and feels safe and connected to his or her school is ready to learn. A student who has

at least one adult in school who understands his or her social and emotional development is more likely to stay in school. All students who have access to challenging academic programs are better prepared for further education, work, and civic life. These components must work together, not in isolation. That is the goal of whole-child education (ASCD, 2011).

At the same time, according to the American Architectural Foundation, "School design will either inhibit or support and enhance such a robust education program," (American Architectural Foundation, 2006). In addition, although every school will reflect the unique needs of its community, there are sound design principles to guide the creation of learning environments that truly promote the kind of education on which 21st century students will thrive (P21, 2009b). These principles include creating learning practices, human support, and physical environments that will support the teaching and learning of 21st century skill outcomes; supporting professional learning communities that enable educators to collaborate, share best practices, and integrate 21st century skills into classroom practice; enabling students to learn in relevant, real-world 21st century contexts (e.g., through project-based or other applied work); allowing equitable access to quality learning tools, technologies, and resources; providing 21st century architectural and interior designs for group, team, and individual learning; and supporting expanded community and international involvement in learning, both face-to-face and online (P21, 2009b).

Linking School to 21st Century Careers

Preparing students to be ready for work, life, and citizenship today requires new pedagogical approaches to individualized learning that focus on helping students develop and improve their skills capacity. New learning approaches not only require new outcomes for what students need to know and be able to do, but they also ask for a different orientation for teaching and learning in the classroom. This orientation might best be summarized by Kolb (1993), who describes learning as a complex combination of thinking, feeling, perceiving, and behaving:

> Learning is the major process of human adaptation. This concept is much broader than that commonly associated with the school classroom. It occurs in all human settings, from schools to the workplace, from the research laboratory to the management boardroom, in personal relationships and the aisles of the local grocery. It encompasses all life stages, from childhood to adolescence, to middle and old age. Therefore it encompasses other, more limited adaptive concepts such as creativity, problem solving, decision making, and attitude change that focus heavily on one or another of the basic concepts of adaptation. (p. 149)

To support this broader notion of learning, P21 and the Career and Technical Education (CTE) communities understand that meeting the nation's skills imperative requires a direct, explicit, and comprehensive strategy: enable students' 21st century learning in the context of a career area. In no way does this strategy diminish the focus on core academic knowledge. In fact, mastering 21st century skills in the course of studying academic content within a career area engages and empowers students to learn and to put their knowledge to good use beyond their school years (P21, Association for Career and Technical Education, National State Directors of Career, & Technical Education, 2010).

There are bodies of academic, employability, and technical knowledge—and academic, work, and technical skills—that go hand in hand. A case in point: Proficient readers bring background knowledge to the texts they read and they acquire new knowledge from their reading. Depending on the text, this knowledge might span any number of topics. Simultaneously, proficient readers routinely use a range of academic, employability, and technical skills to comprehend and make effective use of texts—such as critical thinking skills to analyze text; information, media, and technology skills to access or create texts; and life and career skills to persevere with reading and put forth their best efforts on assignments.

There is a strong connection between how students learn and what they learn. Teaching and learning environments matter. Many students learn more when schoolwork is connected to their interests, to real-world problems, and to the worlds of work and postsecondary education (P21 et al., 2010). Experiences outside of the classroom, variation in the school day, and the ability to use technology and other hands-on tools engage students in learning and help them discover new interests and passions. Instructional strategies that foster higher-order thinking and personalize learning to meet students' specific needs are also critical.

The National Research Council's *Education for Life and Work* Report (Pellegrino & Hilton, 2012) also provided additional connections regarding content and transfer for mastery. The NRC report groups 21st century skills into three domains of what they identify as Deeper Learning Competencies, including cognitive, intrapersonal, and interpersonal. These domains are intertwined and cogently overlap with P21's 4Cs. Emerging evidence indicates that cognitive, intrapersonal, and interpersonal competencies can be taught and learned in ways that promote effective transfer; therefore, students develop deeper learning and can apply what they learned. Furthermore, the report indicated that 21st century skills or competencies provide students with direct positive outcomes, not just throughout their education, but in the workplace and overall health as adults.

Exciting examples of 21st century education models supported by the New Tech Network, National Academy Foundation Academies, and ConnectEd in hundreds of schools and throughout the country offer learning opportunities that make direct connection for students among what they learn, how it is connected to their community, and its links to what students will need to know in college and in the workplace. Developed by the Buck Institute, this summary of attributes describes "project-based learning." These public schooling models recognize that 21st century skills must intentionally be integrated as part of deepening core content knowledge. However, they are not reflective of the teaching of 21st century skills in most schools that are often taught in separate, stand-alone courses (Saavedra & Opfer, 2012).

A wealth of research has examined the value of project-based learning as a valuable tool for promoting 21st century skills, learning, and creativity for students. In fact, 40 years of accumulated evidence shows the instructional strategies and procedures that make up standards-focused Project-Based Learning are effective in building deep content understanding, raising academic achievement, and encouraging student motivation to learn (Buck Institute, 2009). Most compelling of the research is its direct connection to improving students' mastery of 21st century skills,

especially creativity (Gallagher, Stepien, & Rosenthal, 1992; Hmelo, 1998).

Field Testing—Exemplar 21st Century Learning Program

To connect the work P21 has done in creating and spearheading efforts of hundreds of educators around the country and the world in implementing the Framework for 21st Century Learning in living and breathing learning communities, P21 launched the 21st Century Learning Exemplar Program in 2012. The year-one pilot identified 25 emerging exemplars of 21st century learning in 13 states. As of 2014, 40 exemplars have been identified in 19 states and counting. The schools and districts identified by the Exemplar Program provide a showcase of what 21st century learning looks like and where it is happening on the ground. Although many of the exemplars directly utilized the P21 Framework as a foundation for their learning community, there is a great variety in the specific models they use and the manner in which they have implemented 21st century learning opportunities for students.

To capture how 21st century learning was being implemented at these schools and districts, P21 developed multimedia case studies, including video, audio podcasts, and overview summaries. The brief report, *Patterns of Innovation* (Brown, 2013) captures initial findings from this ongoing qualitative study and identifies the shared elements that make these learning communities stand out as 21st century learning exemplars.

Although each learning community had unique strengths and approaches and engaged different resources to create a 21st century learning environment for their community, the pilot study discovered five common themes that were present in every exemplar (see Figure 2). The elements of student agency, distributed leadership, a climate of achievement, an engaged community, and the application of evidence and research were found to be the common, overlapping elements fully integrated throughout the school and/or school district's specific 21st Century School DNA.

Creativity has a central role in many of the Exemplar Schools and takes many conventional and unconventional forms. In Jacksonville, North Carolina, Meadow View Elementary School's leadership, students, and parents view their school as a hub for creativity where all forms of arts are integrated into teaching and learning. Using the A+ Schools Program, Meadow View Elementary combines interdisciplinary teaching and daily arts instruction with a collaborative approach to offer children opportunities to develop creative, innovative ways of thinking, learning, and showing what they know (Brown, 2013).

Another Exemplar School, Spirit Lake High School in Spirit Lake, Iowa, instituted a creative, competency-based approach to learning that is helping Spirit Lake students develop critical thinking, collaboration, and problem-solving skills in an interdisciplinary environment. One of their unique programs is the "J-term," a 4-week period in January during which all high school seniors serve as interns in local community businesses while the remaining high school students (and teacher teams) design and deliver mul-

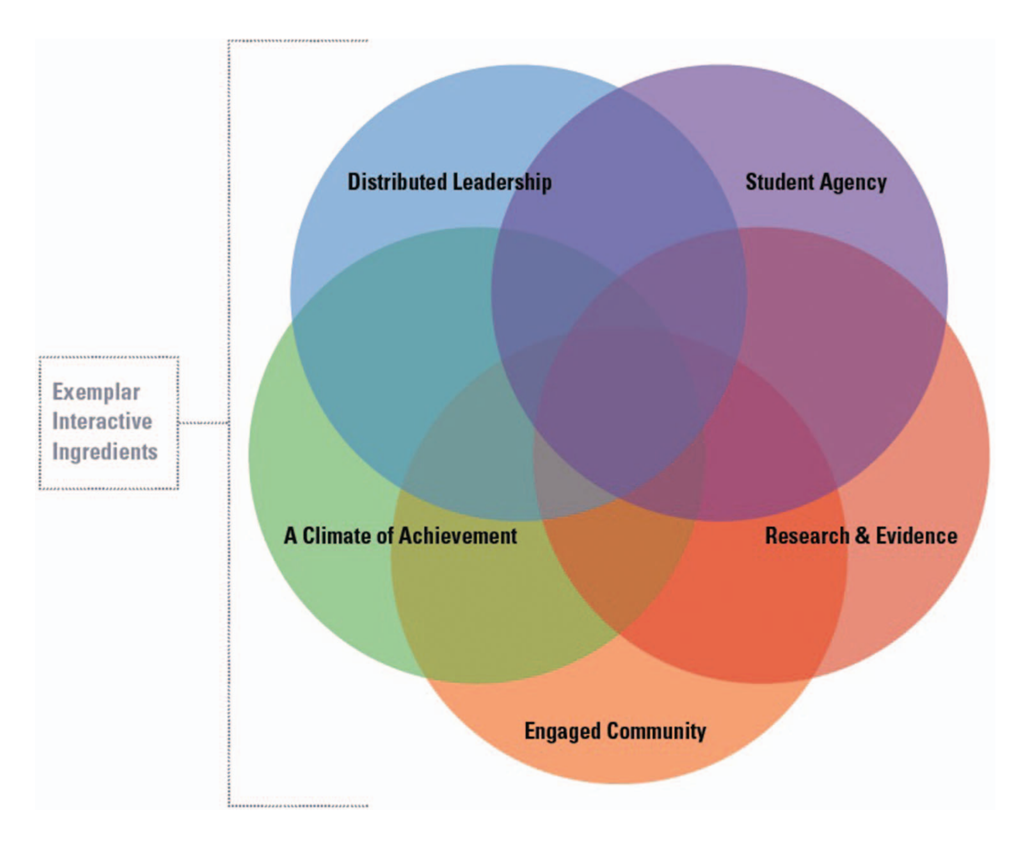


Figure 2. Patterns of Innovation: Exemplar Ingredients (Brown, 2013). See the online article for the color version of this figure.

tiage, cross-curricular projects that benefit the community. Sample projects include *This New House*, in which students worked to create models of their "ideal" home, meeting local building codes and other real-life criteria; a welding project designed to build student interest in and ability to meet local workforce needs; and a research challenge in which students develop recommendations for increasing global food production and availability through a *World Food Prize* competition (Brown, 2013).

P21 has carried on the work of the Exemplar Program beyond the initial pilot year, with over 40 schools and districts having received a 21st century learning Exemplar designation. The program continues to identify and capture additional exemplars across the country and applications for the Exemplar Program are being considered on a yearly basis to showcase 21st century learning in action.

The Future for 21st Century Learning

Ensuring that all students graduate from high school equipped with 21st century knowledge and skills requires a different mindset from the perspective of all members in a learning community, including students, families, teachers and administrators, business leaders, and policy-makers. Teaching and learning cannot be limited to the walls of the classroom and the responsibilities are far too great to be limited just to schools. As examples of 21st century learning proliferate and the understanding of the importance of authentic 21st century learning spreads across the country and worldwide, there will be more opportunities to ensure that all students are given a chance to experience the kind of learning that will prepare them for the future.

Creativity and innovation continue to be the drivers of today's economy, and our education system has yet to figure out solutions to ensure that creativity and innovation play an important role in students' educational experiences in and out of school. As adults, we shoulder a responsibility to ensure that all of our students graduate ready to succeed in college, career, and life. The need for not just some, but all students to succeed is more critical now than ever before given the added challenges of a shift to a global knowledge economy, workforce transitions, the diversification of the student body, and the need for a collective understanding of what it means to be ready for any postsecondary opportunities. Most significantly, this summary has shown that "success" has taken on new meaning for learning in the 21st century. The imperatives are economic, personal, and social, and the potential impact is not only local, but also national and global in scope.

In today's often politically complicated and saturated education reform environment, the work of P21 demonstrates what is possible through the collaboration of policy-makers on both sides of the aisle, business executives, education leaders, and stakeholders, coming together to ensure 21st century readiness for all students. The integration of the Framework for 21st Century Learning in schools and districts both in the United States and abroad provides one successful model of systemic change in curriculum and pedagogy, professional development, assessment, learning environments, and more that lead to significant positive outcomes for students.

The challenge of creating authentic 21st century learning opportunities rests in the hands of education communities and its many stakeholders. To respond to this challenge, communities must engage in a thoughtful dialogue about changing the role and purpose of school and what they must do to prepare all students with the knowledge and skills they will need for life and success beyond. For some, this conversation may require a fundamental change in the way they view their relationship with schools and our traditionally defined educational experience that makes the classroom the sole focus of education reform. For many, it will require ensuring that both students and adults have a chance to collaborate in creating meaningful learning opportunities that mirror the challenges and demands of careers and citizenship today. The urgency to prepare all students for the knowledge economy that demands innovation and creativity grows ever stronger as the days of the 21st century slip away, and there is little time to waste to ensure that the current generation is prepared to lead and succeed.

References

American Architectural Foundation. (2006). *School design and student learning in the 21st century*. Washington, DC: Author.

American Management Association. (2010). *American Medical Association 2010 critical skills survey*. Washington, DC: Author.

ASCD. (2011). *Making the case for educating the whole child*. Alexandria, VA: Author.

Autor, D., Levy, F., & Murnane, R. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics, 118,* 1279–1333. http://dx.doi.org/10.1162/003355303322552801

Brown, C. (2013). *Patterns of innovation: Showcasing the nation's best in 21st century learning*. Washington, DC: P21. Retrieved from http://www.p21.org/storage/documents/exemplars/P21_Patterns_of_Innovation_Final.pdf

Buck Institute. (2009). *Research to support the value of project-based learning*. Novato, CA: Author.

Ewing Marion Kauffman Foundation. (2007). *On the road to an entrepreneurial economy: A research and policy guide*. Kansas City, MO: Author.

Gallagher, S. A., Stepien, W. J., & Rosenthal, H. (1992). The effects of problem-based learning on problem solving. *Gifted Child Quarterly, 36,* 195–200. http://dx.doi.org/10.1177/001698629203600405

Gera, S., & Gu, W. (2004). The effect of organizational innovation and information technology on firm performance. *International Performance Monitor, 9,* 37–51.

Gordon, E. E. (2009). The future of jobs and careers. *Techniques: Connecting Education and Careers, 84,* 28–31.

Hanushek, E., Jamison, D. T., Jamison, E. A., & Woessmann, L. (2008, Spring). Education and economic growth. *Education Next, 8*(2), 62–70.

Hmelo, C. E. (1998). Problem-based learning: Effects on the early acquisition of cognitive skill in medicine. *Journal of the Learning Sciences, 7,* 173–208. http://dx.doi.org/10.1207/s15327809jls0702_2

Institute of Education Sciences. (2011). *National Assessment of Educational Progress*. Washington, DC: Author.

Kolb, D. A. (1993). The process of experiential learning. In M. Thorpe, R. Edwards, & A. Hanson (Eds.), *Culture and processes of adult learning*. London, United Kingdom: Routledge.

Organisation for Economic Co-Operation & Development. (2011). *PISA 2009 at a glance*. Paris, France: Author.

P21, The Conference Board, Corporate Voices for Working Families, & Society of Human Resource Managers. (2006). *Are They Really Ready to Work?* Washington, DC: P21.

P21. (2008). *21st Century Skills, Education and Competitiveness*. Washington, DC: P21.

P21. (2009a). *Assessment: A 21st century skills implementation guide*. Washington, DC: Author.

P21. (2009b). *Learning environments: A 21st century skills implementation guide*. Washington, DC: Author.

P21. (2009c). *P21 Framework definitions*. Washington, DC: Author. Retrieved from http://www.p21.org/our-work/p21-framework

P21. (2009d). *Professional development: A 21st century skills implementation guide*. Washington, DC: Author.

P21. (2009e). *Standards: A 21st century skills implementation guide*. Washington, DC: Author.

P21. (2010). *21st century knowledge and skills in educator preparation*. Washington, DC: Author.

P21. (2011). *P21 Common Core Toolkit: A guide to aligning the Common Core State Standards with the Framework for 21st Century Skills*. Washington, DC: Author. Retrieved December 10, 2011 from http://www.p21.org

P21, Association for Career and Technical Education, & National State Directors of Career and Technical Education. (2010). *Up to the challenge: The role of career and technical education and 21st century skills in college and career readiness*. Washington, DC: P21.

Pellegrino, J., & Hilton, M. L. (Eds.). National Research Council. (2012). *Education for Work and Life: Developing Transferable Knowledge and Skills in the 21st Century*. Washington DC: National Academies Press.

Pilat, D. (2004). *The economic impact of ICT: A European perspective*. Paper presented at the Conference on IT Innovation, Tokyo, Japan.

Plucker, J. (2015). *Common Core and America's high-achieving students*. Washington, DC: Fordham Institute. Retrieved from http://edexcellence.net/publications/common-core-and-americas-high-achieving-students

Porter, M. E., Ketels, C., & Delgado, M. (2007). The microeconomic foundations of prosperity: Findings from the Business Competitiveness Index. *The Global Competitiveness Report 2007–2008*. Geneva: World Economic Forum.

Saavedra, A. R., & Opfer, V. D. (2012). *Teaching and learning 21st century skills: Lessons from the learning sciences*. Santa Monica, CA: The RAND Corporation.

Salahu-Din, D., Persky, H., & Miller, J. (2008). The Nation's Report Card: Writing 2007 (NCES 2008–468). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, D.C.

U.S. Bureau of Labor Statistics. (2012). *Employment data*. Washington, DC: US Department of Labor.

U.S. Census Bureau. (2008). *An older and more diverse nation by midcentury*. Washington, DC: Author.

U.S. Department of Labor & Bureau of Labor Statistics. (2009). *Occupational Employment Projections to 2018: Table 1.2*. Employment by occupation. Washington, DC: US Department of Labor.

Wagner, T. (2008). *The global achievement gap: Why even our best schools don't teach the new survival skills our children need—and what we can do about it*. New York, NY: Basic Books.

Received March 4, 2015
Accepted March 5, 2015 ■